

RESEARCH ARTICLE

# A new wolf spider species of *Wadicosa* (Araneae, Lycosidae) from Western Ghats of India

Raveendran Sudha Abhijith<sup>1</sup>, Ambalaparambil Vasu Sudhikumar<sup>1</sup>

<sup>1</sup> Centre for Animal Taxonomy and Ecology (CATE), Department of Zoology, Christ College (Autonomous), Irinjalakuda, Kerala, India-680125, Affiliated to University of Calicut, Kerala

Corresponding author: Ambalaparambil Vasu Sudhikumar (spidersudhi@gmail.com)

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## Abstract

The new wolf spider species *Wadicosa intermediata* sp. n. belongs to *W. quadrifera* species-group is described based on both sexes collected from Idukki district of Kerala, southern India.

## Keywords

Kerala, Species group, Systematics, Taxonomy

## Introduction

The lycosid subfamily Wadicosinae was erected by Zyuzin in 1985 with a monotypic member *Wadicosa* Zyuzin, 1985 as its only member (Zyuzin 1985). Later the subfamily found to be a junior synonym of subfamily Pardosinae (Piacentini & Ramirez 2019). The genus *Wadicosa* currently includes 17 species of which 4 have been reported from India (WSC 2023). Genus *Wadicosa* shows close resemblance to genus *Pardosa* C.L. Koch, 1847. Most of the current *Wadicosa* species were originally described in *Pardosa* (Ahmed et al. 2014). There may several species of *Wadicosa* still be misplaced in genus *Pardosa* (Kronestedt 2023). So far, three species-groups have been recognized in *Wadicosa*, viz. fidelis-group, manubriata-group and quadrifera-group (Kronestedt 2023). The new species is grouped under the *quadrifera*-species group (Kronestedt 2017) with two Indian species *W. quadrifera* (Gravely, 1924) and *W.*

*ghatica* Kronestedt, 2017. Male individuals of this species group are distinctive by cork-screw shaped embolus and the configuration of tegular apophysis and conductor (Kronestedt 2017). *W. intermediata* sp.n. described based on material of both sexes collected in southern India also possess the unique characters of *quadrifera*- group along with subtle differences that can be used to classify them as a new species. The specimens were found on rocky area with patched vegetation, where they were well camouflaged.

## Materials and Methods

All specimens were collected by hand picking method and preserved in 70% ethanol and studied, photographed and measured using a Leica M205C stereomicroscope, a Leica DFC450 Camera, and LAS software (Ver.4.13). The epigyne was dissected and cleared in 10% potassium hydroxide (KOH) solution. The Male palp was detached and photographed. Ocular measurements were taken from the dorsal side. Leg measurements are shown as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres (mm). Type specimens are stored in Centre for Animal Taxonomy and Ecology, Department of Zoology, Christ College, Irinjalakuda, Thrissur, Kerala, India.

Abbreviations used in the main text are: **ALE** = anterior lateral eye, **AME** = anterior median eye, **Cr** = conductor, **CD** = copulatory duct, **CO** = copulatory opening, **E** = embolus, **MOQ** = median ocular quadrangle, **P** = palea, **PLE** = posterior lateral eye, **PME** = posterior median eye, **PMQ** = posterior median quadrangular depression, **S** = spermathecae, **SS** = septal stem, **TA** = tegular apophysis, **TR** = tegular retrolateral process.

## Results & Discussion

### Taxonomic Accounts

Lycosidae Sundevall, 1833

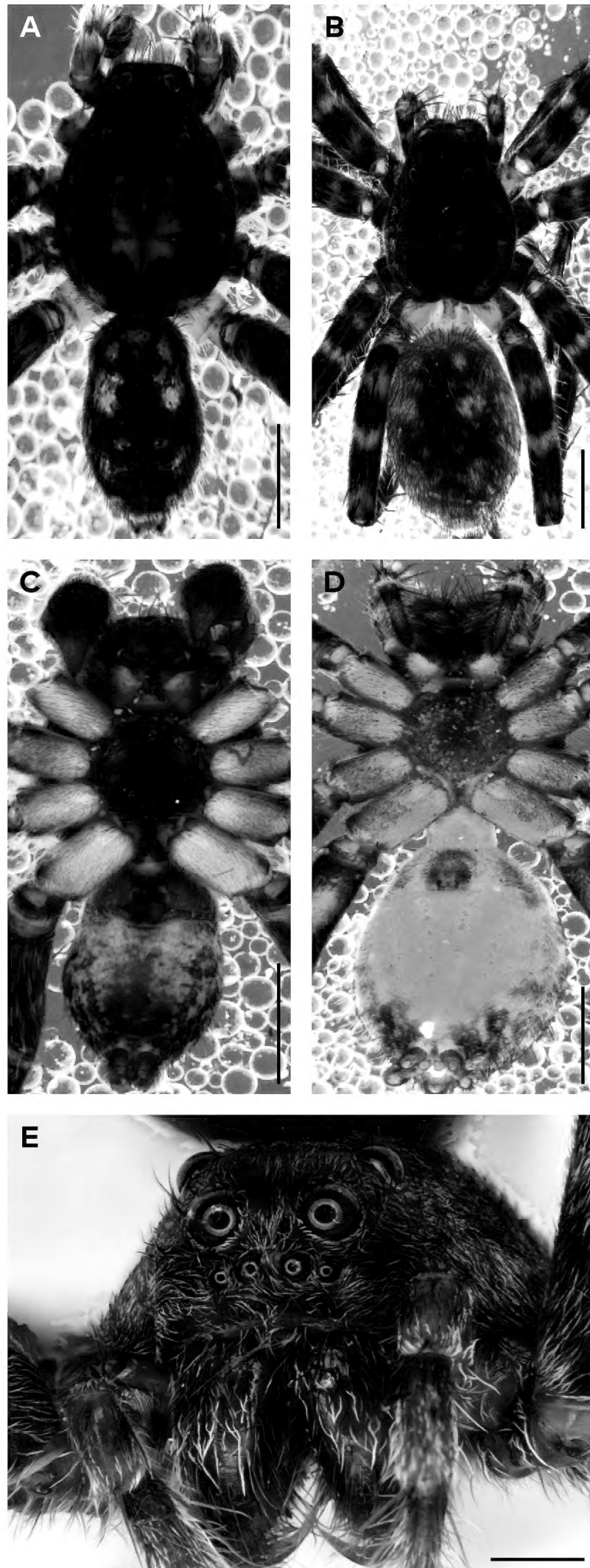
*Wadicosa* Zyuzin, 1985

*Wadicosa quadrifera*-species group

### *Wadicosa intermediata* sp. n.

Figs 1 A–E, 2 A–D, 3 A–B, 4 A–B

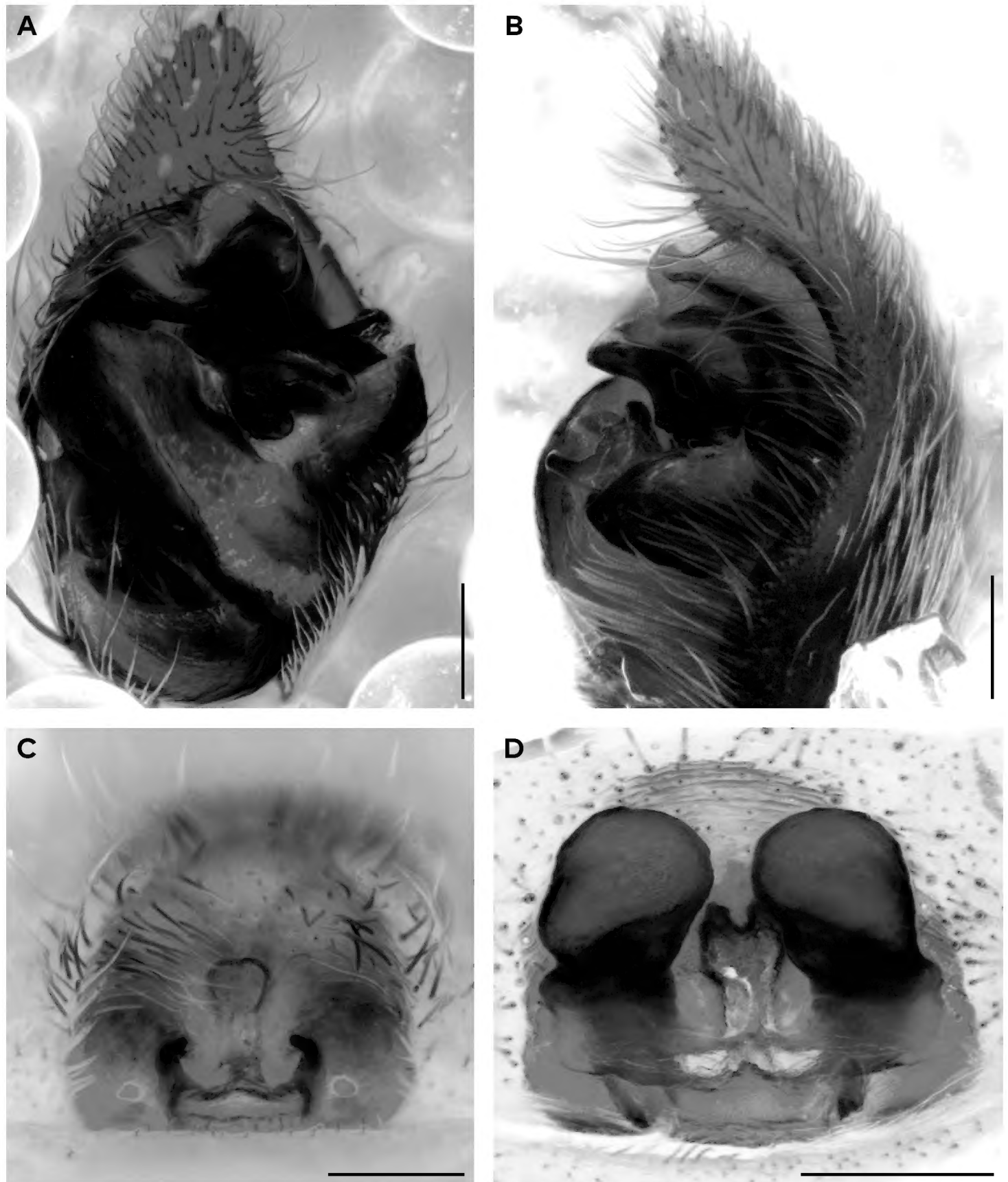
**Etymology:** The specific epithet refers to the intermediate condition of the epigyne, as it possesses features of both *W. ghatica* and *W. quadrifera*.



**Figure 1.** *Wadicosa intermediata* sp. n., holotype male (A, C) and paratype female (B, D, E) habitus: A–B dorsal view C–D ventral view E frontal view. Scale bars: A–D = 1mm; E = 0.5mm.

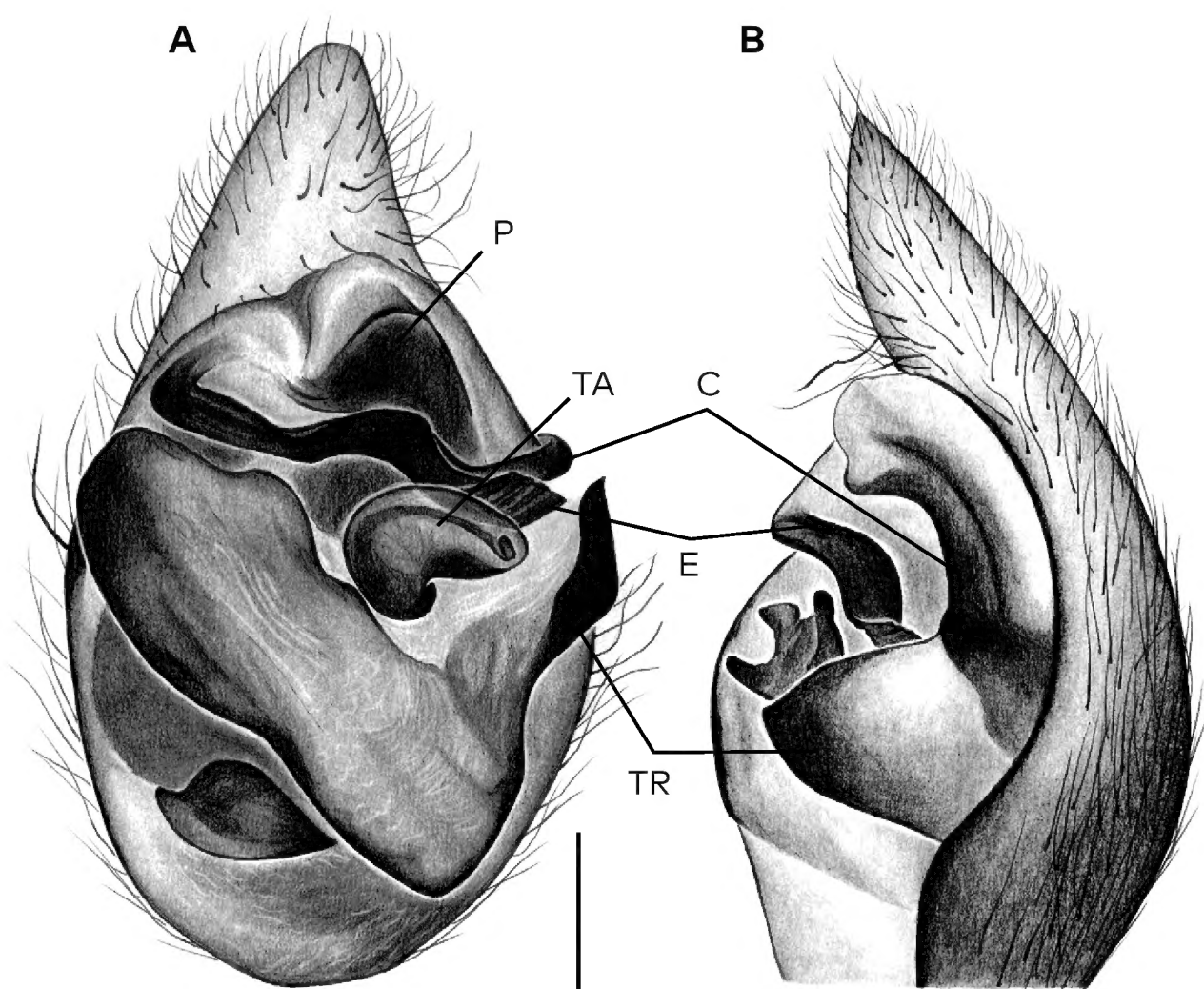
Type Materials: INDIA • 2♂, 1♀; Kottappara, Idukki, Kerala; 10°1. 38' N, 76°58. 11' E; 2194 m a.s.l; 15 October. 2021; R.S. Abhijith leg.; **Holotype:** • 1♂ CATE591225a, **Paratypes:** • 1♂ 1♀ CATE591225b.

**Distribution:** The species is only recorded from the type locality, Kottappara, Idukki, India (Fig. 5).



**Figure 2.** *Wadicosa intermediata* sp. n., copulatory organs: **A** male palp ventral view **B** same retrolateral view **C** epigyne in-situ view **D** same cleared dorsal view. Scale bars = 0.1 mm.





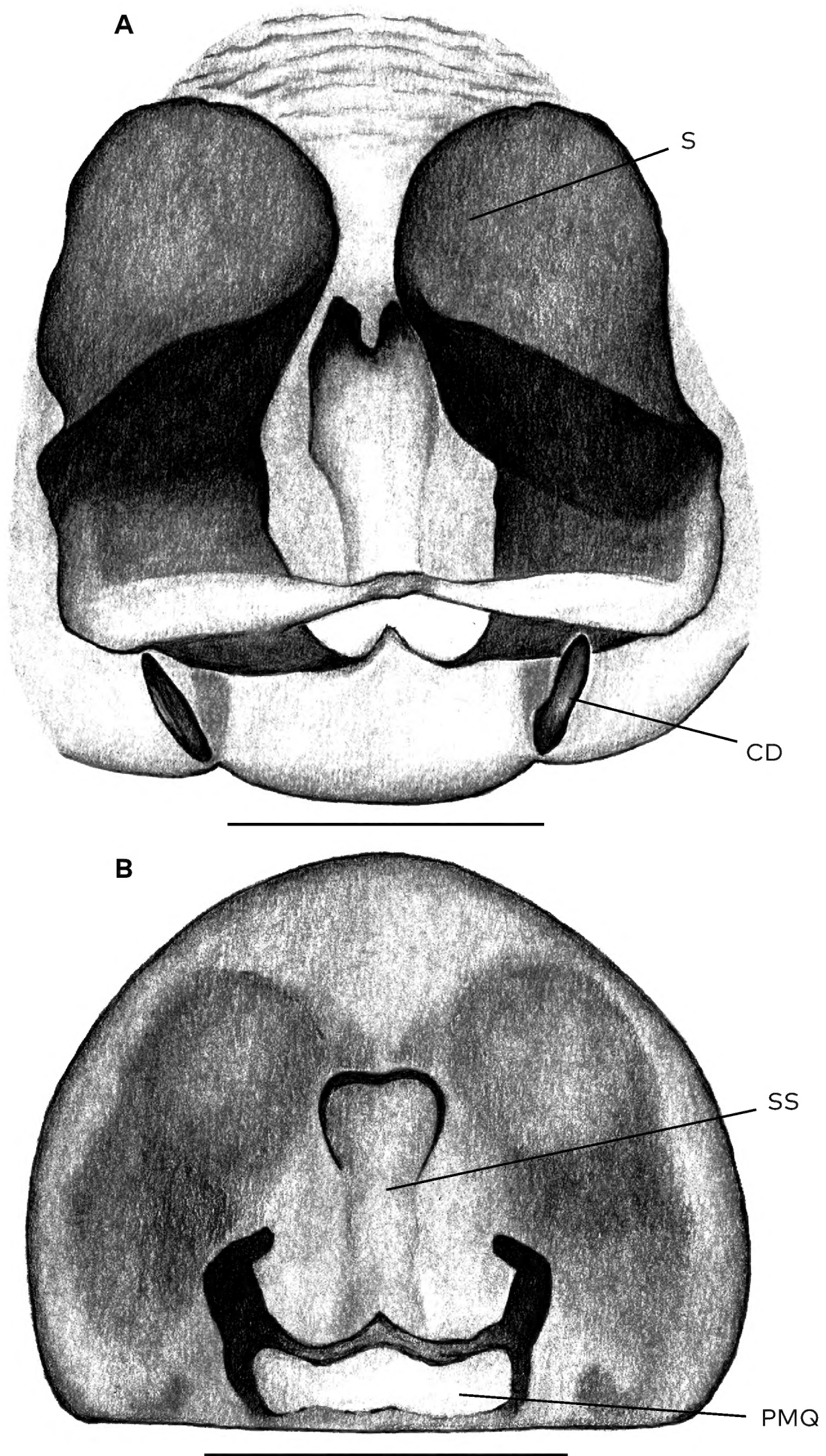
**Figure 3.** *Wadicosa intermediata* sp. n., male palp: **A** ventral view **B** retrolateral view. Scale bars = 0.1mm.

**Diagnosis:** Males identified as members of genus *Wadicosa* by tegulum with anterior retrolateral process pointing ventrad; palea apical to conductor and embolus. Females identified as genus *Wadicosa* by epigyne with two less separated foveolae.

Male palp more similar to *W. ghatica*, but differs by following set of characters, embolus with conspicuous medial bulging and pointed tip (no such bulging and blunter tip in *W. ghatica*); noticable gap between embolus tip and tegular retrolateral process (no gap in *W. ghatica*); tegular reterolateral process blunter (more pointed in *W. ghatica*). The female epigyne more similar to *W. ghatica* but, differs by, posterior median quadrangular depression much broader than long (almost wide as long in *W. ghatica*) and sclerotized finger-like extension of copulatory duct (no such extension in *W. ghatica*).

## Description

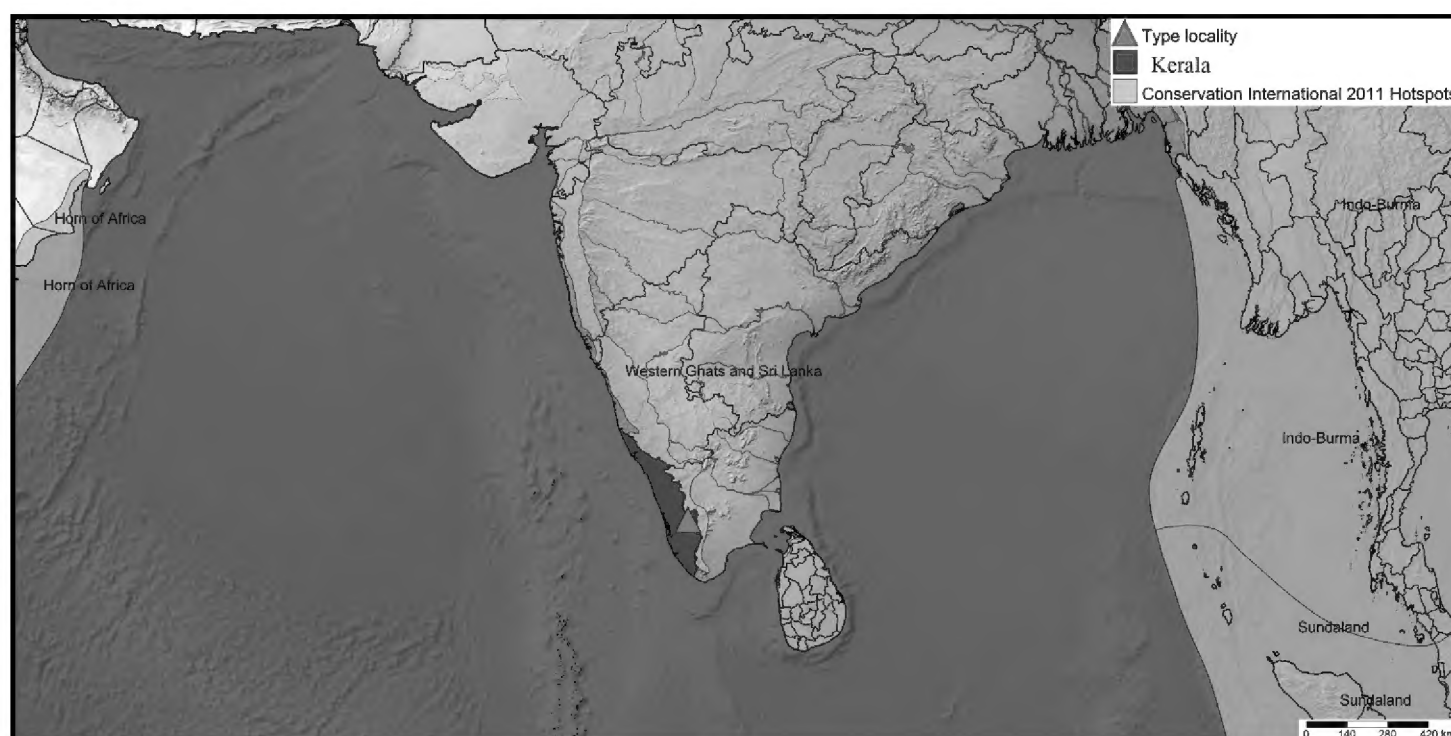
Male (Holotype). Habitus as in Fig. 1A, C: Total length 5.51. Carapace 3.12 long, 2.84 wide. Abdomen 2.31 long, 2.12 wide. Cephalothorax: Carapace brown with lighter area around fovea. Lateral bands discontinuous and indistinct. Lateral and posterior thoracic area with white recumbent hairs, rest of the carapace with numerous short dark hairs. Clypeus 0.35 long, black, without any projection. Labium wider



**Figure 4.** *Wadicosa intermediata* sp. n., female epigyne: **A** ventral view **B** dorsal view. Scale bars = 0.1mm.

than long, darker posteriorly. Chelicera 1.25 long, brown with 3 retrolateral teeth. Sternum black with numerous hairs. Eye diameters and inter-distances: AME 0.18, ALE 0.11, PME 0.29, PLE 0.28. AME–AME 0.14, AME–ALE 0.08, PME–PME 0.36, PME–PLE 0.22, PME–AME 0.12. MOQ narrower anteriorly. Abdomen dorsum same colour as carapace. Lanceolate stripe obscure, dark brown. Shiny yellow dots and patches present. Short, black erect hairs present. Venter yellowish with a distinct black marking anteriorly. Legs are yellowish with wide, dark grey annulations. Coxae light yellow. Leg length: I 7.02 (2.33, 2.67, 1.41, 0.61); II 7.43 (2.27, 2.31, 1.66, 1.19); III 6.55 (2.17, 2.98, 0.71, 0.69); IV 10.72 (3.11, 3.13, 2.91, 1.57). Leg formula 4213. Palp as in figs. 2A–B, 3A–B: Cymbium darker than rest of the palp. White pubescent present. Tegular apophysis crescent-shaped with anteriorly pointed, ventrally curved, narrow upper process and wide, blunt basal process. Embolus cork screw-shaped, bearing a conspicuous bulging medially with pointed tip. Anterior part of tegulum with blunt ended, triangle shaped retrolateral process projecting ventrad. A gap present between embolus tip and retrolateral process. Conductor sclerotized and dorsally curved. Palea (partially membranous part of tegulum) partially sclerotized, positioned anterior to embolus and conductor. Subtegulum positioned prolaterally.

Female (Paratype). Figs. as in 1B, D: Total length 6.62. Carapace 3.11 long, 2.54 wide. Abdomen 3.13 long, 2.52 wide. Cephalothorax: Carapace same colour as in males, but lighter area around fovea indistinct. Lateral margin with white pubescent. Clypeus 0.38 long, black without any projection. Labium wider than longer, darker posteriorly. Chelicera 1.27 long, brown with 3 retrolateral teeth. Sternum light brown with dark pubescent. Eye diameters and inter-distances (Fig 1E): AME 0.20, ALE 0.14, PME 0.31, PLE 0.29. AME–AME 0.16, AME–ALE 0.09, PME–PME 0.39, PME–PLE 0.25,



**Figure 5.** Type locality (Kottapara, Idukki, Kerala, India) of *W. intermediata* sp. n.

PME–AME 0.14. MOQ narrower anteriorly. Abdomen dorsum light brown with inconspicuous yellow spots. Dark and white erect hairs present. Venter yellow with black scattered markings. Legs: Colouration and annulation as in male. Leg length: I 7.68 (2.43, 2.88, 1.62, 0.75); II 8.33 (2.56, 2.56, 1.97, 1.24); III 7.23 (2.29, 3.15, 0.97, 0.82); IV 11.53 (3.22, 3.17, 3.42, 1.72). Leg formula 4213. Epigyne as in figs. 2C–D, 4A–B: Ventral view of epigyne with a PMQ depression which is much wider than long. Median septum with long septal stem, anteriorly with two close pockets (foveolae) forming almost continuous arch. Vulva with bulbous spermathecae. Copulatory duct with sclerotized finger-like projections near copulatory opening. Dorsally septal arch with two well separated lobes.

## Discussion

The new species is the latest member of *W. quadrifera*- species group. Even though, this grouping has no taxon status currently, more findings in future may led to it. Males differ from other *Wadicosa* species except *W. quadrifera* and *W. ghatica* having a cork-screw shaped embolus. The female epigyne is characterized by features of both *W. ghatica* and *W. quadrifera*. The dorsal view of septal arch resembles that of *W. quadrifera*, but the shape of the septal pockets (foveolae) similar to that of *W. ghatica*. A connecting structure is present between spermathecae as in *W. ghatica*. Apart from these, the median quadrangular depression and finger like structures near CO are unique to this new species. The distribution of these three species is continuous and overlapping, suggesting that they are closely related taxa with recent evolutionary divergence. [compare figures, 1–8 of Kronstedt (2017)]

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